

REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

New claims 65-67 have been added.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 38-46 and 64-67 are now pending in this application.

Interview

Applicant wishes to thank the Examiner for granting an interview to discuss the present application on October 7, 2008.

Information Disclosure Statement

Applicant acknowledges receipt of a signed and initialed copy of the PTO/SB/08 form submitted with the Information Disclosure Statement on January 19, 2005.

Applicant notes that an Information Disclosure Statement and PTO/SB/08 form were also submitted on August 4, 2008. Applicant respectfully requests that the Office provide a signed and initialed copy of the PTO/SB/08 form with the next Office correspondence.

Rejection under 35 U.S.C. § 102

Claims 38-42, 44-46, and 64 are rejected under 35 U.S.C. § 102(b) as being anticipated by JP 2000-108824 to Okamura (hereafter "Okamura"). This rejection is respectfully traversed.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). See generally M.P.E.P. § 2131.

Okamura discloses an air cushion 1 that is connected to an air cylinder via a solenoid valve for inflating the air cushion 1. See abstract and Figure 5 of Okamura. Okamura does not disclose that the inclination or stiffness of an impact surface of the airbag is modified on the basis of factors influencing impact kinematics detected by a sensor, as recited in claims 38 and 64.

After considering the translation of Okamura, it becomes clear that (contrary to paragraph 4 of the Office Action) Okamura discloses that items 13 and 12 in Figure 5 are an open/close switch of an electromagnetic valve and a control circuit for the electromagnetic valve, respectively. See paragraph 0007 and the Description of Drawings in the attached machine-prepared translation of Okamura. However, Okamura does not disclose any feature that would modify the inclination or stiffness of the air cushion 1 on the basis of factors influencing impact kinematics detected by a sensor. Therefore, Okamura does not anticipate claims 38-42, 44-46, and 64 because Okamura does not disclose all of the features of claims 38 and 64.

For at least the reasons discussed above, reconsideration and withdrawal of this rejection is respectfully requested.

Rejection under 35 U.S.C. § 103

Claim 43 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Okamura in view of JP 6-239198 to Suzuki (hereafter “Suzuki”). This rejection is respectfully traversed. Suzuki fails to remedy the deficiencies of Okamura discussed above in regard to independent claim 38, from which claim 43 depends.

The translation of Suzuki clarifies that Suzuki discloses a device that can include multiple airbags 72 and inflators 70. See abstract and Figures 7, 9, and 10 of Suzuki. The device also includes various sensors, such as an obstacle detecting sensor 1, a speed sensor 2, an acceleration sensor 3, and a brake switch 4. See paragraphs 0011-0013 in the attached machine-prepared translation of Suzuki. However, Suzuki does not disclose or suggest that information from these sensors is used to provide information for modifying an inclination or stiffness of the impact surface of an airbag.

For at least the reasons discussed above, reconsideration and withdrawal of this rejection is respectfully requested.

New Claims

New claims 65-67 have been added. Claims 65-67 depend from claim 38 and are allowable over the prior art for at least the reasons discussed above and for their respective additional recitations.

Conclusion

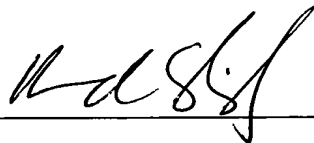
Applicant submits that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing or a credit card payment form being unsigned, providing incorrect information resulting in a rejected credit card transaction, or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

Date 10/8/2008

By 

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention is a thing about the safeguard aiming at personal protection of the vehicles for protecting a pedestrian from an injury in case of the collision of vehicles and a pedestrian, It is related with the personal protection air-cushion device of the vehicles which blow up the air cushion accommodated in the state where it contracted especially to the car body front with high pressure gas.

[0002]

[Description of the Prior Art]Although the bumper for softening the shock of a collision on the conventional vehicles in case of a vehicle collision accident is attached before and after the body, There is nothing that protects a pedestrian from the shock of a collision in case of a personal collision, and a pedestrian may jump off on vehicles, or may run aground on a bonnet, may hit hard by a windshield, or it falls on the ground surface, and he may be involved in the body, may get injured greatly, and may die.

[0003]

[Problem(s) to be Solved by the Invention]This invention cancels these conventional problems, just before vehicles collide with a pedestrian, it blows up an air cushion greatly in a car body front, a pedestrian is caught in an air cushion, the shock of a collision is eased, and it is in providing the personal protection air-cushion device of the vehicles kept from resulting in a big accident.

[0004]

[Means for Solving the Problem]Composition of this invention which solved this technical problem is 1. Where an air cushion is contracted, it attaches to a car body front, A high pressure gas supply line from a high pressure gas supply source is connected to said air cushion via an opening and closing valve, Provide a final controlling element of said opening

and closing valve in a driver's seat, and an air cushion carries out quick inflation by operation of opening an opening and closing valve in a car body front, A front face of the body. Covering. The personal protection air-cushion device 2 of vehicles by which it is characterized. Shape of an air cushion which expanded. Personal protection air-cushion device 3 of vehicles of said one statement which a **** top made cubic shape of approximately L type which consists of *****s behind a horizontal level and a horizontal level in the upper part An inclined plane which made anterior part of a horizontal level of an air cushion which expanded, and the upper part of a wall incline linearly with a predetermined angle from the level surface is provided, So that the inclined plane front end of anterior part of a horizontal level of an air cushion and the front end of an air-cushion pars basilaris ossis occipitalis may cross. The personal protection air-cushion device 4 of vehicles of said two statement carried out. Height of an inclined plane upper bed of anterior part of an air-cushion horizontal level which expanded. the personal protection air-cushion device 5 of vehicles of said three statement made higher than an air-cushion horizontal level -- a network which people fall by both side of a horizontal level of an air cushion which expanded, and prevents omission was formed -- said -- an inside of personal protection air-cushion device 6 air cushion of vehicles of a statement two to 4 either. Divide into two or more independent rooms, branch a high pressure gas supply line to plurality, and said air cushion contracted one to 5 either in a bumper of personal protection air-cushion device 7 car body front of vehicles of a statement linked to each independent room is accommodated, Press a bumper from an inside by expansion of an air cushion, and a bumper is opened, said 1-6 it was made for an air cushion to jump out -- either -- the personal protection air-cushion device 8 of vehicles of a statement -- along with a cross direction of the body, two or more ventilation flues were provided in an air cushion which expanded -- said -- vehicles of a statement personal protection air-cushion device 9 one to 7 either. A deep cut of the shape of a ctenidium which puts people between said air-cushion anterior part using a raw material more transparent than a windshield of vehicles in the air-cushion upper part in which it is located up, and which expanded in which vehicles of a statement carried out personal protection air-cushion device 10 expansion one to 8 either. it provided -- said -- 1 to 9 either is in a personal protection air-cushion device of vehicles of a statement.

[0005]

[Function]In this invention, during operation, if it judges that a pedestrian is discovered to a vehicle front and a collision cannot be avoided, while stepping on a brake, the switch of a driver's seat is operated, the opening and closing valve of a high pressure gas supply source is opened, and an air cushion is blown up. If high pressure gas flows into the air cushion accommodated in the state where it contracted in the bumper, An air cushion begins to swell within a bumper, presses a bumper from the inside, and removes a bumper upper bed from the body, a bumper opens it focusing on the pin connection part of a bumper lower end, and

an air cushion swells quickly to specified shape in a car body front. A pedestrian has a shock of the collision with vehicles eased by the air cushion, and can minimize an injury. What made shape of the air cushion the cubic shape which consists of a horizontal level and a wall catches a pedestrian by a horizontal level, and eases the shock of the collision with the body by a wall. What made the inclined plane the anterior part of the horizontal level of an air cushion and the upper part of the wall pushes in an air cushion caudad, it prevents having been turned over up, stabilizes an air cushion in a prescribed position, dips up a pedestrian in the inclined plane of anterior part, and is made to fall in an air cushion with a wind pressure. A pedestrian falls from the transverse direction of an air cushion, and what what furthermore made the height of the horizontal level the position lower than the Mogami end of the inclined plane of anterior part caught the pedestrian in the air cushion, and prevented jumping out ahead [air-cushion] as a reaction, and formed the network in both the sides of the horizontal level is kept from falling. Since high pressure gas flows into each space simultaneously, even if shape formation of an air cushion is easy and some air cushions are damaged, damage is made as for what divided the inside of an air cushion into two or more independent rooms to the minimum. What provided two or more ventilation flues which miss the airstream by a wind pressure in the air cushion secures a pedestrian in the state where stabilized the gestalt of the air cushion and it was stabilized. The thing using the raw material more transparent than the windshield of vehicles to the air cushion of the upper part secures a front field of view from a driver's seat, and can move vehicles safely after an air-cushion device operation. What put the deep cut of the shape of a ctenidium into air-cushion anterior part is incised, and a pedestrian is put inside and it secures him.

[0006]

[Embodiment of the Invention]The construction material of an air cushion has a desirable thing with the proof stress of the Kevlar cloth etc. to which the airtight film was made to adhere. Since the inflator etc. which are used as a high pressure gas supply source as a gas supply source of a high-pressure air cylinder or the existing air bag device can send in a lot of [momentarily] gas, they are desirable. As an opening and closing valve provided in the supply line of high pressure gas, there are manual control, pneumatic pressure operation, mechanical control, and a thing that carries out solenoid operation.

[0007]

[Example]The example of this invention is described based on a drawing below. Drawing 1 The perspective view after air-cushion expansion of the personal protection air-cushion device of the vehicles of this example, The side view showing the state where it secured in the air cushion in which drawing 2 expanded the A-A sectional view in drawing 1, drawing 3 expanded the B-B sectional view in drawing 1, and drawing 4 expanded the pedestrian, The explanatory view and drawing 6 which drawing 5 shows the supply line of high pressure gas The front view

of the bumper of a car body front, The cross-sectional view of the bumper which accommodated the air cushion which contracted drawing 7, the front view of the air cushion in which drawing 8 has a dent in the center section and which expanded, Drawing 9 is a C-C sectional view in drawing 8, and a perspective view showing the state where the D-D sectional view in drawing 8 and drawing 11 caught the example of shape of others of an air cushion, drawing 12 caught the cross-sectional view of the air cushion of drawing 11 (c), and drawing 10 caught the pedestrian to the air cushion of drawing 11 (d), as for drawing 13. The horizontal level of the air cushion 1 whose 1a the air cushion expanded one in this example (drawing 1 - 13 references) figure, and expanded the separating wall in the air cushion 1 and 2, the wall of the air cushion 1 which expanded 3, and 4 are the inclined planes of horizontal level 2 anterior part, and the upper bed is in a position higher than the horizontal level 2. The network which provided 5 in the inclined plane of the wall 3 upper part, and provided 6 in both the sides of the horizontal level, the ventilation flue which has the rectangular section which provided three 7 in the wall 3 lining up side-by-side, The pin by which 8 stops the bumper of body 19 anterior part, and 8a stops bumper 8 lower end and the body 19, The locking hole which 8b established in the tip part of the bumper 8 upper part, the bumper sandwiching part which provided 8c in the body 19, The locking piece of the upper bed of the bumper sandwiching part 8c which engages with the locking hole 8b 8 d, and 9 An electromagnetic valve, The air cylinder in which 10 expands the air cushion 1, and 11 branched into four from the middle with the air supply line from the air cylinder 10 to the air cushion 1, and have connected with four independent rooms of the air cushion 1, respectively. As for a check valve and 17, a pedestrian and 19 are the bodies a cut part and 18 the open/close switch of the electromagnetic valve which provided 12 in the control circuit of the electromagnetic valve 9, and 13 formed in the driver's seat, the crevice of the air cushion 1 which expanded 14, the side attachment wall of the air cushion 1 which expanded 15, and 16. In the personal protection air-cushion device of the vehicles of this example. If it judges that it has accommodated in the bumper 8 where the air cushion 1 is contracted, and the pedestrian 18 is discovered in operation and ahead of vehicles, and a collision cannot be avoided, while stepping on a brake, The electromagnetic valve 9 which operated the switch 13 of the driver's seat and was formed in the supply line of the air cylinder 10 is opened, and air is made to flow in the air cushion 1. If air flows into the air cushion 1 accommodated in the state where it contracted in the bumper 8, the air cushion 1 will begin to swell within the bumper 8, The bumper 8 is pressed from the inside and bumper 8 upper bed is removed from the body 19, and the bumper 8 opens focusing on the pin connection part 8a of bumper 8 lower end, and it expands quickly to specified shape in a car body front. The air cushion 1 divides an inside into four in a lengthwise direction, and since it has branched and connected the supply line 11 of the air cylinder 10 to each divided independent room, it is easy to carry out shape formation of it. The position of the air cushion 1 is stabilized by a wind

pressure hitting the inclined planes 4 and 5, and stuffing the air cushion 1 which expanded into them caudad, after the air cushion's 1 expanding, and missing the airstream by a wind pressure from the ventilation flue 7. As a supply source of high pressure gas, the inflator used for the existing air bag device besides the air cylinder 10 can be used. the independent room of the air cushion 1 which divided the inflator according to the capacity of the air cushion 1 on that occasion -- time to attach to each and for the air cushion 1 expand is made brief. The ignition switch of the inflator is formed in the driver's seat. At the time of a collision, the pedestrian 18 is dipped up out of a step, and falls in the air cushion 1 which expanded, and lump prehension is carried out by the inclined plane 4. By counteraction of a collision, since the horizontal level 2 of the air cushion 1 which expanded at this time is in a position lower than the upper bed of the inclined plane 4, prevent the pedestrian 18 running out ahead, and with the network 6 of both the sides of the horizontal level 2. It catches in the air cushion 1 which prevented the pedestrian 18 falling and falling to the transverse direction of the air cushion 1 which expanded, and expanded it certainly. With the air cushion 1 which expanded, the pedestrian 18 escapes carrying out a direct collision to the body 19, and can avoid a big injury. Since the upper part of the air cushion 1 which expanded uses transparent construction material, it can secure the field of view of the front from a driver's seat, and enables it to move vehicles to a safe place, even after the air cushion's 1 expanding. What was made into the shape which dented the center section as shows the shape of the air cushion 1 which expanded to drawing 8 - 10 is kept from jumping out ahead by counteraction of the collision with the air cushion 1 which caught the pedestrian 18 and expanded in the crevice 14, and is kept from falling and falling to a transverse direction by each side walls 15. Air-cushion 1 inside is divided into four in a lengthwise direction, and since the supply line 11 of the air cylinder 10 was branched in each divided independent room and it has connected with it, it is easy to carry out shape formation. The rectangular parallelepiped to which as for the shape of the air cushion 1 (a) divided the inside into plurality as shown in drawing 11, That to which (b) quadrisected the inside into the lengthwise direction by the shape of a cubic shape of L type, the thing to which (c) divided the inside of (b) into five in the transverse direction further, and (d) have various shape, such as a thing of cubic shape which provided the deep cut of the shape of a ctenidium. The air which flowed since the check valve 16 was prepared for the terminal area of each part store which divided as shown in drawing 12 does not flow backwards, but (c) is easy to carry out shape maintenance of the air cushion 1. As are shown in drawing 13, and (d) puts the pedestrian 18 between the cut part 17, it catches him in the air cushion 1. The personal protection air-cushion device of the vehicles of this example can ease the shock by collision by making it operate, when not only the purpose of personal protection but vehicles are likely to collide with the wall of the road side, or a telegraph pole or other cars, and can reduce damage to vehicles, and can soften the shock to a driver or a passenger.

[0008]

[Effect of the Invention]According to this invention, an air cushion can be blown up in a car body front, the shock of a collision of a pedestrian and the body can be eased, and a pedestrian can be protected from a big injury. It prevents making low one step of horizontal level of the air cushion which expanded, and flying a pedestrian ahead by counteraction of the collision with an air cushion, and a network is formed in both the sides of a horizontal level, it prevents a pedestrian falling and falling to a transverse direction, and the pedestrian was certainly caught in the air cushion. What established the inclined plane in the air cushion which furthermore expanded, and the thing which provided the ventilation flue can catch a pedestrian in an air cushion certainly in the state where stabilized the position of the air cushion and it was stabilized. An air cushion can be expanded in a car body front not only at a chisel but at the time of an object collision at the time of a personal collision, a collision can be eased, and damage to vehicles can be reduced, and the shock to a driver or a passenger can be softened.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]It is a perspective view after air-cushion expansion of this example.

[Drawing 2]It is an A-A sectional view in drawing 1.

[Drawing 3]It is a B-B sectional view in drawing 1.

[Drawing 4]It is a side view showing the state where the pedestrian was secured in the air cushion which expanded.

[Drawing 5]It is an explanatory view showing the supply line of high pressure gas.

[Drawing 6]It is a front view of a bumper.

[Drawing 7]It is a cross-sectional view of a bumper.

[Drawing 8]It is a front view of the air cushion which has a dent in the center section and which expanded.

[Drawing 9]It is a C-C sectional view in drawing 8.

[Drawing 10]It is a D-D sectional view in drawing 8.

[Drawing 11]It is an example of shape of others of the air cushion which expanded.

[Drawing 12]It is a cross-sectional view of the air cushion of drawing 11 (c).

[Drawing 13]It is a perspective view showing the state where the pedestrian was caught in the air cushion of drawing 11 (d).

[Description of Notations]

1 Air cushion

1a Dividing chamber

2 Horizontal level

3 Wall

4 and 5 Inclined plane

6 Network

7 Ventilation flue

- 8 Bumper
- 8a Pin
- 8b Locking hole
- 8c Bumper sandwiching part
- 8 d Locking piece
- 9 Electromagnetic valve
- 10 Air cylinder
- 11 Supply line
- 12 The control circuit of an electromagnetic valve
- 13 The open/close switch of an electromagnetic valve
- 14 Crevice
- 15 Side attachment wall
- 16 Check valve
- 17 Cut part
- 18 Pedestrian
- 19 Body

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application]This invention relates to the air bag device of the vehicles which take care of the weak, such as a pedestrian especially to vehicles, at the time of the unexpected collision with vehicles about the protection instrument which is carried in vehicles, such as a car, and operates in the case of the collision of vehicles.

[0002]

[Description of the Prior Art]Recently, in the car, it is useful to reduce the damage which the attach rate of the driver's seat and passenger seat air bag device which take care of a crew member at the time of the collision with other cars or a road-side obstacle is increasing, the air bag device operates at the time of a collision, and a crew member receives. On the other hand, the collision of a car and the weak to a car, such as a pedestrian, has also occurred daily by various causes, such as elutriation to steep lanes, such as a driver's simple operation mistake, inescapable lane deviation by steering at the time of collision avoidance with other cars, or a pedestrian.

[0003]

[Problem(s) to be Solved by the Invention]Although the protection instrument from which the conventional car protects a crew member as mentioned above in the case of a collision is equipped, since the protection instrument which takes care of the weak, such as a pedestrian, is not equipped at all, On the occasion of the unexpected collision with a pedestrian etc. and a car, the technical problem that these weak side will suffer very miserable and great physical and material damage, such as bounding off by the bumper of a car, etc., or it being involved in the lower part of the body, or being pulled with a tire, occurred.

[0004]This invention was made in order to solve the above technical problems, and an object of an invention is to obtain the air bag device of the vehicles which can suppress the damage

by the side of the weak, such as a pedestrian, to the minimum in the case of the unexpected collision with a car.

[0005]

[Means for Solving the Problem]An air bag device of vehicles concerning an invention of the 1st of this invention, Are stored by vehicle traveling direction front end part at the time of un-operating, when a collision with an obstacle of a vehicle traveling direction is predicted, have an air bag who develops toward a vehicle traveling direction, and an air bag, At the time of deployment, it is considered as the shape of an extensive form used as the shape of an approximately wedge to which the undersurface approaches with a road surface, the upper surface is located below in a lower end of a windscreen of vehicles, and the front face covers a bumper of vehicles at least, and the top-surface-view shape makes the peak the front end part on a vehicles medial axis.

[0006]An air bag device of vehicles concerning an invention of the 2nd of this invention, It has an air bag who develops toward a direction of movement of a bonnet vehicle when it is stored by direction-of-movement front end part of a bonnet vehicle at the time of un-operating and a collision with an obstacle of a direction of movement of a bonnet vehicle is predicted, As for an air bag, at the time of deployment, the undersurface approaches with a road surface and the upper surface covers some hood tops of a bonnet vehicle at least, It is considered as the shape of an extensive form used as the shape of an approximately wedge to which the front face covers a bumper of a bonnet vehicle at least, and the top-surface-view shape makes the peak the front end part on a vehicles medial axis.

[0007]An air bag device of vehicles concerning an invention of the 3rd of this invention, Are stored by vehicle traveling direction front end part at the time of un-operating, when a collision with an obstacle of a vehicle traveling direction is predicted, have two or more air bags who develop toward a vehicle traveling direction, and two or more air bags, While being mutually combined among air bags whom a front face and the upper surface adjoin at least when it develops, At the time of deployment, it is considered as the shape of an extensive form used as the shape of an approximately wedge to which the undersurface approaches with a road surface, the upper surface is located below in a lower end of a windscreen of vehicles, and the front face covers a bumper of vehicles at least, and the top-surface-view shape makes the peak the front end part on a vehicles medial axis.

[0008]

[Function]In the invention of the 1st of this invention, when the collision with the obstacle of a vehicle traveling direction is predicted, In an air bag, the undersurface approaches with a road surface, and the upper surface is located below in the lower end of the windscreen of vehicles, Since it develops so that it may become the shape of an approximately wedge to which the front face covers the bumper of vehicles at least, and the top-surface-view shape makes the

peak the front end part on a vehicles medial axis, When a pedestrian etc. collide with unexpected, while a pedestrian etc. do not do direct contact to a bumper but the impulse force at the time of a collision is eased, even if it is derived to the outside of a vehicle traveling direction and falls before a collision further, being involved in the body lower part is prevented. [0009]When the collision with the obstacle of a vehicle traveling direction is predicted in the 2nd invention of this invention, In an air bag, the undersurface approaches with a road surface, and the upper surface covers some hood tops of a bonnet vehicle at least, Since it develops so that it may become the shape of an approximately wedge to which the front face covers the bumper of a bonnet vehicle at least, and the top-surface-view shape makes the peak the front end part on a vehicles medial axis, While acting like the 1st above-mentioned invention, even if a pedestrian falls on the hood top at the time of a collision according to the position of the bumper of a bonnet vehicle being lower than a pedestrian's center of gravity, the impulse force is eased.

[0010]In the invention of the 3rd of this invention, since it is mutually combined among the air bags whom a front face and the upper surface adjoin at least when two or more air bags develop, the capacity of the air bag per one becomes small, and expansion speed is sped up.

[0011]

[Example]Hereafter, the example of this invention is described about a figure.

example 1. -- this Example 1 is one example concerning the invention of the 1st of this invention. The block diagram showing the entire configuration of the air bag operation system in the air bag device of the vehicles which require drawing 1 for Example 1 of this invention, Drawing 2 is a mimetic diagram showing the car carrying the air bag device of the vehicles concerning Example 1 of this invention, For example, by an ultrasonic system sensor, 1 is constituted in a figure and The right and left of the front end part of the car 20, A brake switch and 5 are accelerator switches the obstacle detecting sensor attached to three places of a center, the speed sensor attached near the rear wheel in front of the car 20 2, the acceleration sensor with which 3 was attached to the car 20, and 4. A seat belt tension actuator and 10 are seat belts the collision prediction part in which 6 built the microprocessor, the air bag device carried in the front end part of the car 20 7, the conflict-alert part allocated by the instrument panel 8, and 9.

[0012]The obstacle detecting sensor 1, the speed sensor 2, the acceleration sensor 3, the brake switch 4, and the accelerator switch 5 are connected to the input port of the collision prediction part 6, and the air bag device 7, the conflict-alert part 8, and the seat belt tension actuator 9 are connected to the output port of the collision prediction part 6.

[0013]Below, the air bag operation system by this Example 1 is explained. It is being detected whether each obstacle detecting sensor 1 attached to three places of the front end part of the car 20 emits an ultrasonic wave to the direction of movement of the car 20, for example,

receives the ultrasonic wave reflected from obstacles, such as a pedestrian who is present in a direction of movement, and its obstacle is in the direction of movement of the car 20. Detection of that obstacles, such as a pedestrian, are in the direction of movement of the car 20 with either of these obstacle detecting sensors 1 will output a detecting signal to the collision prediction part 6 from the obstacle detecting sensor 1. Then, the vehicles speed calculated in the collision prediction part 6 from the wheel speed of a wheel before and after obtaining from the speed sensor 2, Based on the treading-in state of the car body deceleration acquired from the acceleration sensor 3, each brake further obtained from the brake switch 4 and the accelerator switch 5, and an accelerator pedal, the degree of near collision with a forward cardiac failure theory thing is judged.

[0014]Subsequently, if the collision with a forward cardiac failure theory thing is predicted, the collision collision part 6 will output a conflict-alert signal to the conflict-alert part 8, will output an air bag driving signal to the air bag device 7, and will output a driving signal to the seat belt tension actuator 9 further. And in the conflict-alert part 8, an alarm is carried out to a driver by sound, display, etc. with a conflict-alert signal, With the air bag device 7, an air bag is developed toward a direction of movement with an air bag driving signal, by the seat belt tension actuator 9, the seat belt 10 is strained with a driving signal, a driver's driving posture is corrected, and a driver's collision-avoidance operation is assisted.

[0015]Here, the structure of the air bag device 7 is concretely explained based on drawing 3. This air bag device 7 comprises the case 73 where it has the surface panel 73a in which the inflator 70, the driving circuit part 71, the air bag 72, and the slot 73b that is closing-in parts in part were established. The inflator 70 consists of the ignition 70a, the inflammation agent 70b, the generation-of-gas agent 70c, and the filter 70d, and is attached to the case 73. The air bag 72 is built in in the case 73, and is attached to the inflator 70 that the inside has so that [airtightness] it may be held. As shown in drawing 4, the air bag device 7 constituted in this way is stored inside the front hood 12 on the bumper 11 of the car 20 so that the field of view of the driver from the windscreen 13 may not be interrupted, The chassis was stopped and equipped with the case 73 and only the surface panel 73a is always exposed to a car body surface. Then, the shape of surface type of this surface panel 73a is decided in consideration of the front design of the car 20.

[0016]Then, if an air bag driving signal is outputted to the air bag device 7 from the collision prediction part 6, An air bag driving signal is inputted into the driving circuit part 71, from the driving circuit part 71, it energizes to the ignition 70a of the inflator 70, the filament of the ignition 70a heats, and, thereby, the igniting agent in the ignition 70a lights. The flame generated with the ignition 70a is extremely spread for a short time to the inflammation agent 70b and also the generation-of-gas agent 70c, and generates a lot of nitrogen gas from the generation-of-gas agent 70c with the flame of the inflammation agent 70b. When this nitrogen

gas passes the filter 70d, it is cooled while cinder is removed, and it is filled with it in the air bag 72, and it expands the air bag 72. The air bag 72 prevents a pedestrian etc. from developing rapidly so that the bumper 11 of the front face of the car 20 may be covered, and colliding with the body directly, as the slot 73b of the surface panel 73a of the case 73 is pushed and broken, it expands further, expanding and it is shown in drawing 5.

[0017]At this time, the upper surface 72U of the air bag 72 at the time of deployment being set up become a position lower than the lower end of the windscreen 13, interrupting a driver's field of view, and barring collision-avoidance operation is prevented. The undersurface 72L is set up approach a road surface, and even if a pedestrian etc. fall before a collision, it is not involved in the body lower part. The front face 72F is formed in the shape of [which serves as an approximately triangle which saw from the upper surface 72U and made the vertex the front end surface of the air bag 72 on the medial axis of the body] a wedge shape, and after pedestrians contact the air bag 72, they are derived to the outside of the direction of movement of the car 20.

[0018]Thus, when the air bag 72 of the air bag device 7 develops according to the Example 1, The upper surface 72U becomes a position lower than the lower end of the windscreen 13, Since it is considered as the shape of an extensive form which turns into the shape of a wedge shape used as the approximately triangle which the undersurface 72L approached the road surface, and the front face 72F saw from the upper surface 72U further, and made the vertex the front end surface of the air bag 72 on the medial axis of the body, Even if the weak to the cars 20, such as a pedestrian, collide with unexpected with the car 20, the body is not directly contacted with big acceleration, or it is not involved in the body lower part, and the damage which a pedestrian etc. suffer can be kept to the minimum.

[0019]Even if it collides with obstacles, such as other cars and a structure, damage of an obstacle, a self-vehicle, or its crew member is mitigable according to the air bag's 72 buffer effect.

[0020]A driver's field of view is not barred at the time of the air bag's 72 deployment, and a driver's avoidance operation is fully performed.

[0021]Since only the surface panel 73a is exposed to a car body surface, the design nature of vehicles is not spoiled by equipping with the air bag device 7.

[0022]example 2. -- this Example 2 is one example concerning the invention of the 2nd of this invention. Drawing 6 is a front perspective view showing the time of air bag deployment of the car carrying the air bag device of the vehicles concerning Example 2 of this invention. This Example 2 shows the case where a car is the bonnet vehicle 21, and the air bag device 7 is stored inside the bumper 11 always, At the time of collision prediction, the air bag's 72 undersurface 72L approaches a road surface, and the front face 72F covers the bumper 11, The upper surface 72U covers the hood top 14, and it is constituted so that the front face 72F

may serve as the shape of a wedge shape used as the approximately triangle which saw from the upper surface 72U and made the vertex the front end surface of the air bag 72 on the medial axis of the body further and it may develop. Other composition is the same composition as the above-mentioned Example 1.

[0023]Generally, since the bonnet vehicle 21 has a position of the bumper 11 in a position lower than a pedestrian's center of gravity, when a pedestrian collides with the bonnet vehicle 21, it collides with the bumper 11 first, a pedestrian's head is struck by big impulse force on the hood top 14, and it has a case which causes a serious obstacle. However, since according to the air bag device 7 by this Example 2 the air bag 72 is developed so that that front face 72F may cover the bumper 11 and that upper surface 72U may cover the hood top 14, Even if a pedestrian does not do a direct collision to the body of bumper 11 grade and a metaphor pedestrian falls on the front face 72F on the after-contact hood top 14, a shock is substantially eased by the buffer effect of the air bag's 72 upper surface 72U, and the damage by the side of a pedestrian to suffer can be kept to the minimum.

[0024]Like the front-face side, it is not necessary to thicken thickness on the air bag's 72 hood top 14, it does not bar a driver's field of view, and does not bar a driver's avoidance operation.

[0025]example 3. -- this Example 3 is other examples of the 1st and an invention of the 2nd of this invention. In the above-mentioned Examples 1 and 2, although the air bag device 7 shall expand the one air bag 72 at the one inflator 70, As shown in drawing 7, the three inflators 70 shall be attached to the one air bag 72, and the air bag device 7 shall consist of this Example 3.

[0026]According to this Example 3, the three inflators 70 can be operated simultaneously, the air bag's 72 working medium flow can be made to increase in addition to the same effect as the above-mentioned Examples 1 and 2, and the air bag's 72 expansion speed can be sped up further.

[0027]example 4. -- this Example 4 starts the invention of the 1st and the 2nd of this invention - it is an example of others [pan]. Although the one air bag device 7 provided with the one air bag 72 shall constitute the air bag device of vehicles from the above-mentioned Examples 1 and 2, The two air bag devices 7 provided with the one air bag 72 shall be arranged adjacently, and the air bag device of vehicles shall consist of this Example 4.

[0028]In this Example 4, the two air bag devices 7, Adjoin the inside of the bumper 11 always, it is stored by right and left, and the two air bag devices 7 drive simultaneously at the time of collision prediction, Develop so that the air bag 72 of both the air bag devices 7 may touch mutually by the abbreviated medial axis of the bonnet vehicle 21, and as shown in drawing 8, the whole air bag's shape, The undersurface approaches a road surface, the front face covers the bumper 11, and the upper surface covers the hood top 14, and it is constituted so that the front face may serve as the shape of a wedge shape used as the approximately triangle which

saw from the upper surface and made the vertex the front end surface on the medial axis of the body further and it may develop.

[0029]According to this Example 4, while doing so the same effect as the above-mentioned Examples 1 and 2, the capacity of the air bag 72 per one can become small, an air bag's expansion speed can be sped up, the air bag device 7 per one more can be miniaturized, and the flexibility at the time of vehicles loading is raised.

[0030]Although the above-mentioned Example 4 explains the air bag device carried in the bonnet vehicle 21 as what is constituted from the two air bag devices 7, the effect same also as what constitutes the air bag device carried in the car 20 from the two air bag devices 7 is carried out.

[0031]Although the air bag device is explained as what is constituted from the two air bag devices 7, three sets or the air bag device 7 beyond it may constitute an air bag device from the above-mentioned Example 4.

[0032]example 5. -- this Example 5 is one example concerning the invention of the 3rd of this invention. Drawing 9 is a sectional view showing typically the composition of the air bag device of the vehicles concerning Example 5 of this invention. As for the air bag device 7 by this Example 5, the two inflators 70 are attached to the case 73, It is attached that the air bag 72 has so that [airtightness] it may be held to each of the inflator 70, and more than one are provided in the front face and upper surface, and predetermined gaps are consisted of so that air bag 72 comrades which the zone of junction 74 which connects between the air bags 72 further developed may be mutually close. Other composition is constituted like the above-mentioned Example 1.

[0033]In this Example 5, at the time of collision prediction, the two inflators 70 of the air bag device 7 drive simultaneously, and develop both the air bags 72 simultaneously. Both the air bags 72 give suitable tension to the zone of junction 74 formed in the front face and upper surface, and they develop it so that it may touch mutually by the abbreviated medial axis of vehicles. At this time, the shape of a whole extensive form which consists of both the air bags 72 turns into the above-mentioned Example 1 and the shape of same extensive form.

[0034]According to this Example 5, even if a pedestrian etc. contact in the two air bags' 72 middle at the time of a collision, it is not inserted into the air bag's 72 gap by the zone of junction 74, and can function as an air bag of one. Each air bag's 72 capacity can be made small, and expansion speed can be sped up.

[0035]example 6. -- this Example 6 is other examples concerning the invention of the 3rd of this invention. Although the inflator 70 and 2 sets of air bags 72 should be stored and between the air bags 72 shall be connected with the zone of junction 74 in the air bag device 7 in the above-mentioned Example 5, In this Example 6, as shown in drawing 10, the same effect is done so as what connects between the air bags 72 who store the inflator 70 and 3 sets of air

bags 72, and adjoin in the air bag device 7 with the zone of junction 74.

[0036]Although the above-mentioned Examples 5 and 6 explain as what is applied to the car 20 of the above-mentioned Example 1, the same effect is done so even if it applies to the bonnet vehicle 21 of the above-mentioned Example 2.

[0037]Although the air bag device shall be constituted from the one air bag device 7, two or more air bag devices 7 may constitute an air bag device from the above-mentioned Examples 5 and 6.

[0038]Although each above-mentioned example explains as what equips the anterior part of vehicles with an air bag device, the rear of vehicles can be equipped and it is effective in the protection at the time of the collision and rear-end collision at the time of sternway in this case.

[0039]

[Effect of the Invention]It comprises this invention as mentioned above.

Therefore, an effect which is indicated below is done so.

[0040]According to the invention of the 1st of this invention, it is stored by the vehicle traveling direction front end part at the time of un-operating, When the collision with the obstacle of a vehicle traveling direction is predicted, have an air bag who develops toward a vehicle traveling direction, and an air bag, At the time of deployment, the undersurface approaches with a road surface and the upper surface is located below in the lower end of the windscreen of vehicles, Since it is considered as the shape of an extensive form used as the shape of an approximately wedge to which the front face covers the bumper of vehicles at least, and the top-surface-view shape makes the peak the front end part on a vehicles medial axis, being involved in the body lower part, even if it is derived to the outside of a vehicle traveling direction and falls before a collision further while a pedestrian etc. do not do direct contact to a bumper but the impulse force at the time of a collision is eased, when a pedestrian etc. collide with unexpected is prevented -- a pedestrian's etc. damage -- the minimum -- being hard -- it stops -- it can do. The air bag who developed cannot bar a driver's field of view, and collision-avoidance operation can be taken enough. Also when obstacles are other vehicles and structures, damage of an obstacle, a self-vehicle, and its crew member can be reduced according to an air bag's buffer effect.

[0041]According to the invention of the 2nd of this invention, it is stored by the direction-of-movement front end part of a bonnet vehicle at the time of un-operating, When the collision with the obstacle of the direction of movement of a bonnet vehicle is predicted, have an air bag who develops toward the direction of movement of a bonnet vehicle, and an air bag, At the time of deployment, the undersurface approaches with a road surface and the upper surface covers some hood tops of a bonnet vehicle at least, Since it is considered as the shape of an extensive form used as the shape of an approximately wedge to which the front face covers

the bumper of a bonnet vehicle at least, and the top-surface-view shape makes the peak the front end part on a vehicles medial axis, While doing so the same effect as the 1st above-mentioned invention, even if a pedestrian falls on the hood top at the time of a collision according to the position of the bumper of a bonnet vehicle being lower than a pedestrian's center of gravity, the impulse force is eased and a pedestrian's damage can be kept to the minimum.

[0042]According to the invention of the 3rd of this invention, it is stored by the vehicle traveling direction front end part at the time of un-operating, When the collision with the obstacle of a vehicle traveling direction is predicted, have two or more air bags who develop toward a vehicle traveling direction, and two or more air bags, While being mutually combined among the air bags whom a front face and the upper surface adjoin at least when it develops, At the time of deployment, the undersurface approaches with a road surface and the upper surface is located below in the lower end of the windscreen of vehicles, Since it is considered as the shape of an extensive form used as the shape of an approximately wedge to which the front face covers the bumper of vehicles at least, and the top-surface-view shape makes the peak the front end part on a vehicles medial axis, While doing so the same effect as the 1st above-mentioned invention, the capacity of the air bag per one becomes small, and an air bag's deployment response can be improved.

[Translation done.]

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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]It is the block which shows the entire configuration of the air bag operation system in the air bag device of the vehicles concerning Example 1 of this invention.

[Drawing 2]It is a mimetic diagram showing the car carrying the air bag device of the vehicles concerning Example 1 of this invention.

[Drawing 3]It is a sectional view showing typically the composition of the air bag device of the vehicles concerning Example 1 of this invention.

[Drawing 4]It is a front perspective view about the car carrying the air bag device of the vehicles concerning Example 1 of this invention.

[Drawing 5]It is a front perspective view showing the time of air bag deployment of the car carrying the air bag device of the vehicles concerning Example 1 of this invention.

[Drawing 6]It is a front perspective view showing the time of air bag deployment of the car carrying the air bag device of the vehicles concerning Example 2 of this invention.

[Drawing 7]It is a sectional view showing typically the composition of the air bag device of the vehicles concerning Example 3 of this invention.

[Drawing 8]It is a front perspective view showing the time of air bag deployment of the car carrying the air bag device of the vehicles concerning Example 4 of this invention.

[Drawing 9]It is a sectional view showing typically the composition of the air bag device of the vehicles concerning Example 5 of this invention.

[Drawing 10]It is a sectional view showing typically the composition of the air bag device of the vehicles concerning Example 6 of this invention.

[Description of Notations]

7 Air bag device

11 Bumper

13 Windscreen

14 Hood top

20 Car

21 Bonnet vehicle

72 Air bag

72U Air bag upper surface

72F Front face of an air bag

72L Air bag undersurface

74 Zone of junction

[Translation done.]